



DEPARTMENT OF COMMUNITY DEVELOPMENT

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HELPFUL BUILDING GUIDELINES

DECKS

HOW TO USE THIS GUIDE:

This guide has been designed to assist the do-it-yourselfer to create a construction plan to build an *attached/uncovered deck* to an existing structure using constructions methods compliant with the 2018 IRC Code.

1. **COMPLETE THIS BUILDING GUIDE** by filling in the blanks on page two and four and indicate which construction details will be used.
2. **SUBMITTAL REQUIREMENTS** to be completed/fulfilled as required by the Community Development Department
3. **NOW YOU ARE READY TO APPLY FOR YOUR BUILDING PERMIT.** Submittal of all the required documents will help determine compliance with the building code, zoning ordinance and applicable laws.
4. **INSPECTIONS.** As stated in the Submittal Requirements a 24 hour advance notice to the Community Development Department is required for inspections. Inspections required are listed, but not limited to those on the *Required Inspection Brochure*.

Remember **YOU** are responsible to call for the inspections.

If you are unsure during the construction process please contact our Department for assistance.

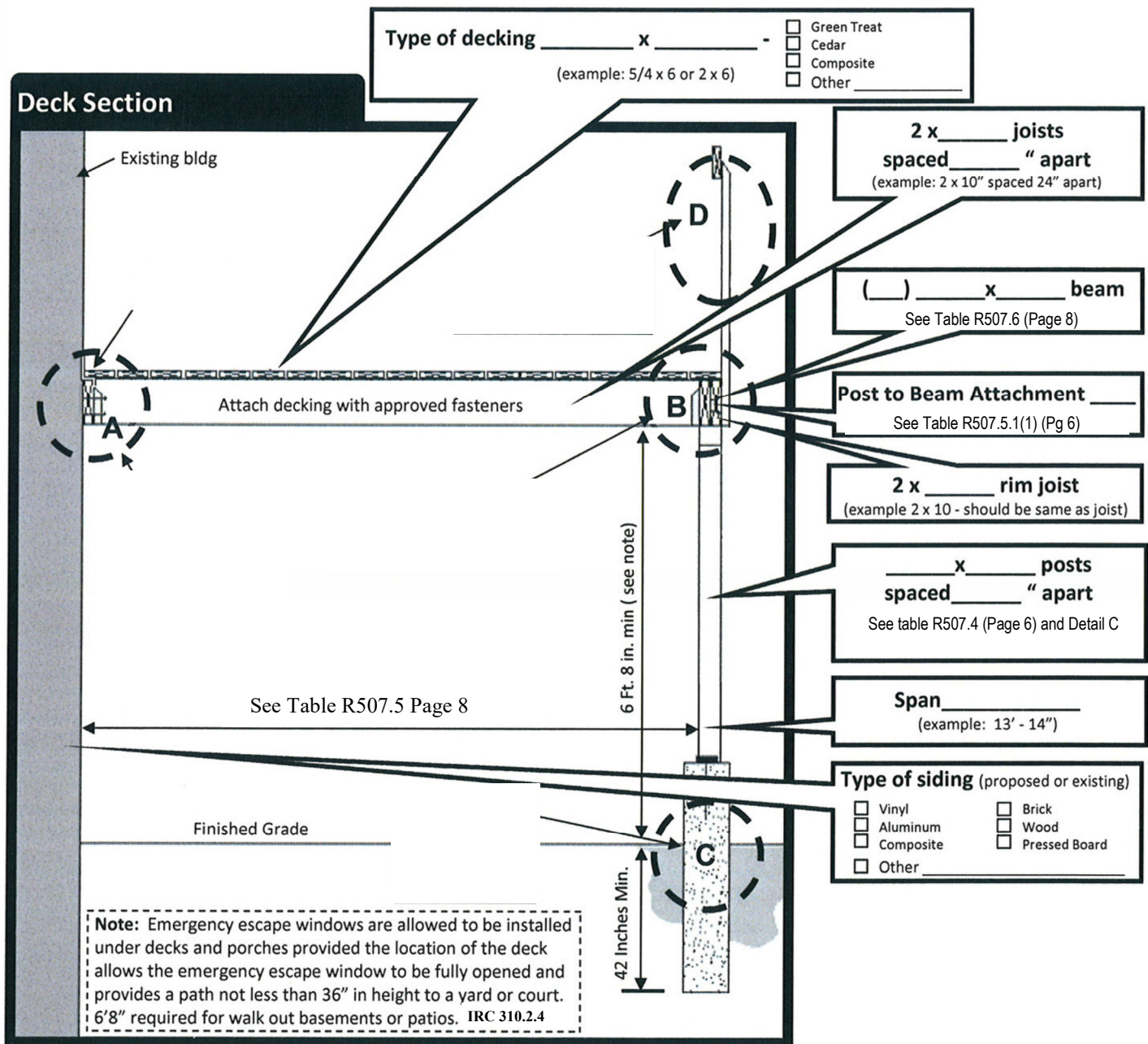
There will be a \$75 fee assessed for any missed inspection required for your project.



DISCLAIMER: This handout has been created by Tazewell County Community Development to assist with code compliance under the 2018 International Residential Code and is not intended to cover all circumstances. For further questions please check with the Department.

Minimum Requirements:

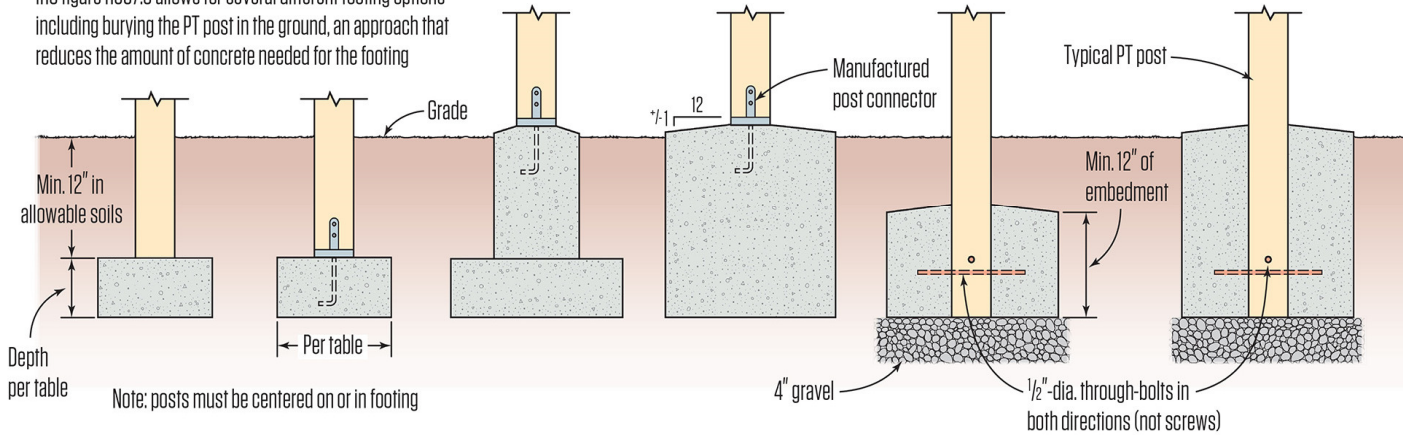
- All lumber shall be naturally durable wood or pressure treated.
- All screws, bolts, and nails for use with preservative treated wood shall be hot-dipped galvanized, stainless steel, silicon bronze or copper. Fasteners to be hot-dipped galvanized shall meet the requirements of ASTM A 153, Standard Specification for Zinc Coating (Hot- Dip) on Iron and Steel Hardware, Class D for fasteners 3/8" in diameter and smaller or Class C for fasteners with diameters over 3/8". IRC Table R507.2.3
- All hardware (joist hangers, cast-in-place post anchors, etc.) shall be galvanized or shall be stainless steel. Hardware to be hot-dipped prior to fabrication shall meet ASTM A 653, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process, G-185 coating. Hardware to be hot-dipped galvanized after fabrication shall meet ASTM A123, Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.



DECKS - FOOTINGS



IRC figure R507.3 allows for several different footing options including burying the PT post in the ground, an approach that reduces the amount of concrete needed for the footing

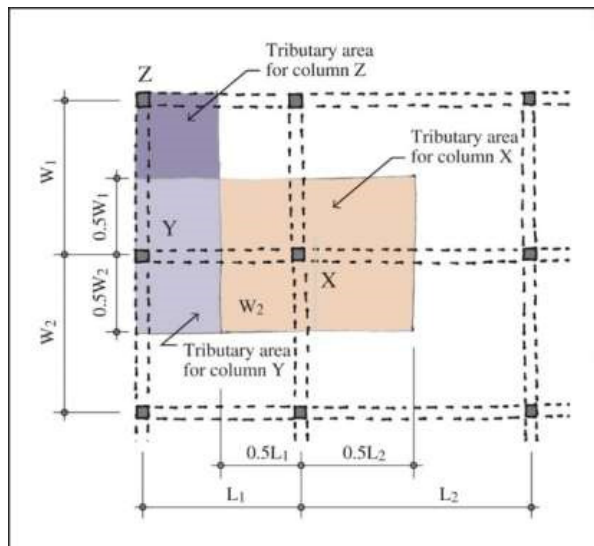


Standard Reference (1500 psf) unless soil analysis is provided.

DETAIL C

Live Load (psf)	Tributary Area (square feet)	Square Footing Each side (inches)	Diameter of Round (inches)	Minimum Footing Thickness (inches)
40	20	12	14	6
	40	14	16	6
	60	17	19	6
	80	20	22	7
	100	22	25	8
	120	24	27	9
	140	26	29	10
	160	28	31	11

Calculating Tributary Area



Minimum footing depth shall extend beyond the frost line of 36".

Exceptions:

1. Free-standing decks that meet all of the following criteria, **footings not required**:

1.1 The joist bear directly on precast concrete pier blocks at grade without support by beams or posts.

1.2 The area of the deck **does not exceed 200 square feet**.

1.3 The walking surface is **not more than 20" above grade** at any point within 36" measured horizontally from the edge

ured

2. Free-standing decks do not require frost protection extending beyond 36" below grade.

DECKS — Ledgers

DIRECTIONS:

- Identify Ledger Size 2 x _____ X _____ (example 2' x 10 " X 10')
- Identify # of fasteners needed _____ Size _____ X _____ @ _____ O.C.
(example two 1/2" X 6" lags @ 18" O.C. See Table A1) *If using fasteners other than 1/2 lag or bolts, provide manufacturer's specs.
- Location of lateral load connections _____ (see Figure A2)

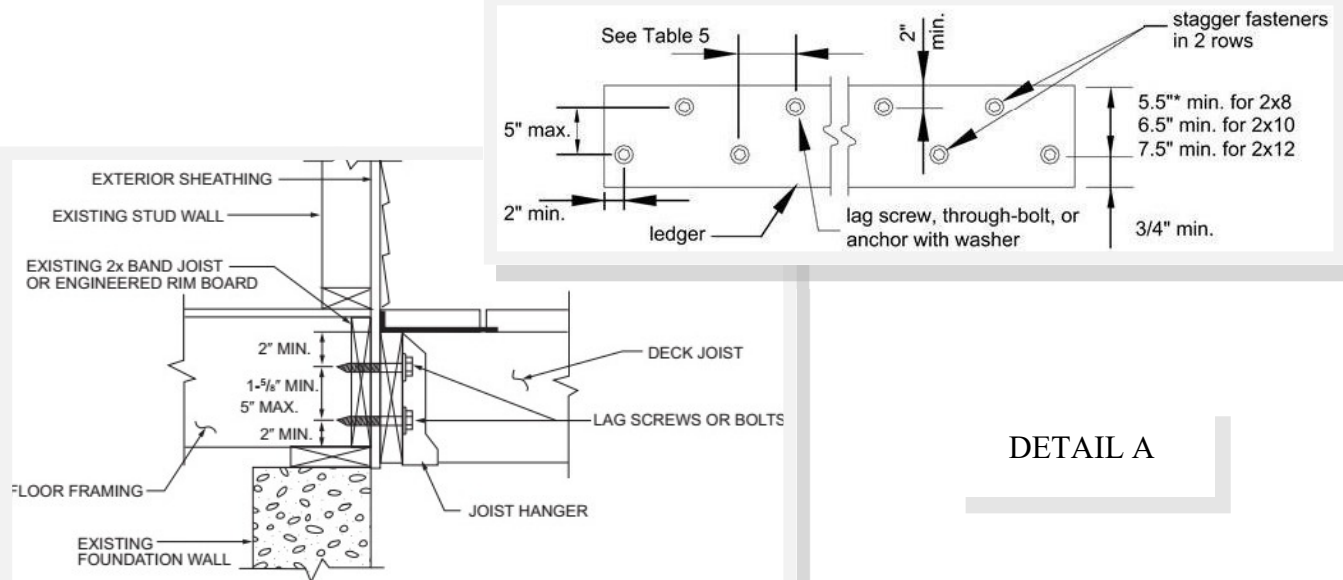
- ☐ 1/2 Lags
☐ 1/2 Bolts
☐ 1/2 Bolts w washers
☐ Other* _____

TABLE R507.9.1.3(1)
DECK LEDGER CONNECTION TO BAND JOIST*
(Deck live load = 40 psf, deck dead load = 10 psf)

CONNECTION DETAILS	JOIST SPAN						
	6' and less	6'1" to 8'	8'1" to 10'	10'1" to 12'	12'1" to 14'	14'1" to 16'	16'1" to 18'
	On-center spacing of fasteners						
1/2-inch diameter lag screw with 1/2-inch maximum sheathing ^{b, c}	30	23	18	15	13	11	10
1/2-inch diameter bolt with 1/2-inch maximum sheathing ^c	36	36	34	29	24	21	19
1/2-inch diameter bolt with 1-inch maximum sheathing ^d	36	36	29	24	21	18	16

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

- Ledgers shall be flashed in accordance with Section R703.4 to prevent water from contacting the house band joist.
- The tip of the lag screw shall fully extend beyond the inside face of the band joist.
- Sheathing shall be wood structural panel or solid sawn lumber.
- Sheathing shall be permitted to be wood structural panel, gypsum board, fiberboard, lumber, or foam sheathing. Up to 1/2-inch thickness of stacked washers shall be permitted to substitute for up to 1/2 inch of allowable sheathing thickness where combined with wood structural panel or lumber sheathing.



DETAIL A

TABLE R507.9.1.3(2)
PLACEMENT OF LAG SCREWS AND BOLTS IN DECK LEDGERS AND BAND JOISTS

	MINIMUM END AND EDGE DISTANCES AND SPACING BETWEEN ROWS			
	TOP EDGE	BOTTOM EDGE	ENDS	ROW SPACING
Ledger ^a	2 inches ^d	3/4 inch	2 inches ^b	1 5/8 inches ^b
Band Joist ^c	3/4 inch	2 inches	2 inches ^b	1 5/8 inches ^b

For SI: 1 inch = 25.4 mm.

- Lag screws or bolts shall be staggered from the top to the bottom along the horizontal run of the deck ledger in accordance with Figure R507.9.1.3(1).
- Maximum 5 inches.
- For engineered rim joists, the manufacturer's recommendations shall govern.
- The minimum distance from bottom row of lag screws or bolts to the top edge of the ledger shall be in accordance with Figure R507.9.1.3(1).

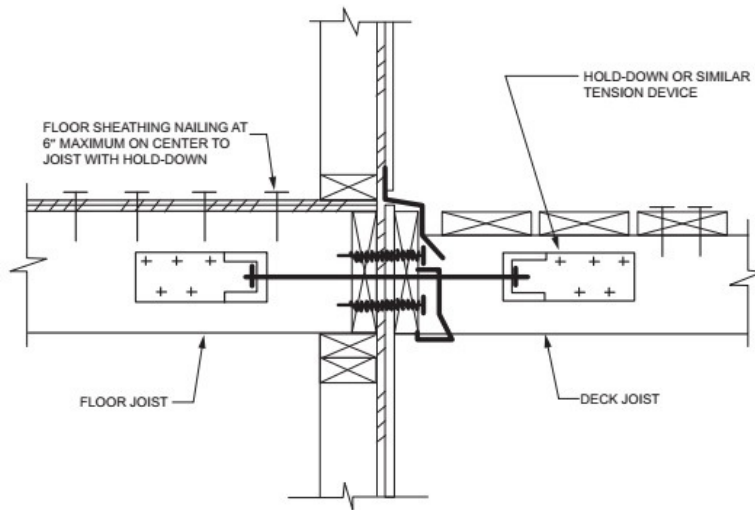


Figure R507.9.2(1)

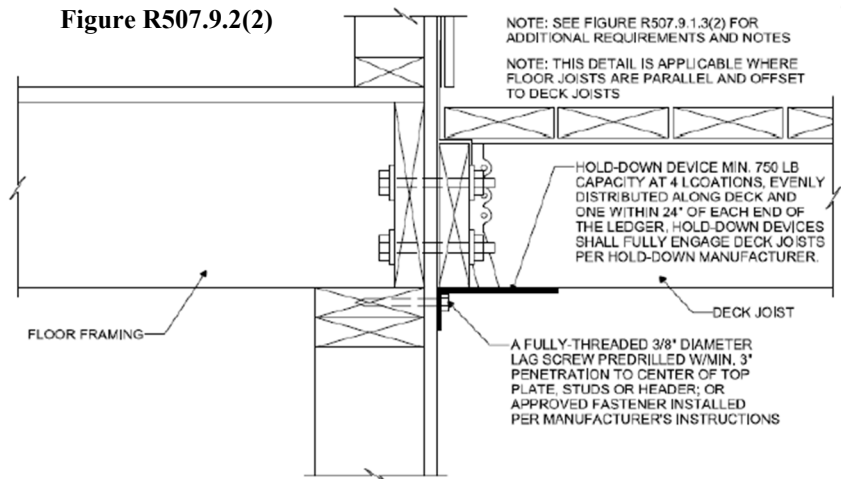
R507.9.2 Lateral Connection.

Lateral loads shall be transferred to the ground or to a structure capable of transmitting them to the ground. Where the lateral load connection is provided in accordance with Figure **R507.9.2 (1)**, hold-down tension devices shall be installed in not less than two locations per deck, within 24 inches (610 mm) of each end of the deck. Each device shall have an allowable stress design capacity of not less than 1,500 pounds.

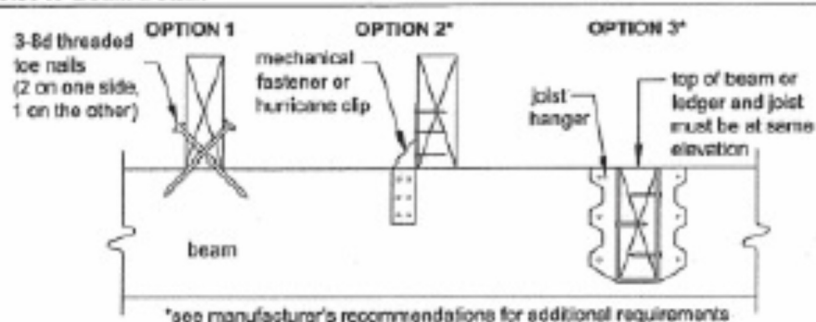
Figure R507.9.2(2)

R507.9.2 Lateral Connection.

Where the lateral load connections are provided in accordance with Figure **R507.9.2(2)**, the hold-down tension devices shall be installed in not less than four locations per deck, and each device shall have an allowable stress design capacity of not less than 750 pounds.



JOIST-TO-BEAM Detail.



DECKS - Posts

Table R507.4
Deck Post Height

Deck Post Size	Maximum Height (feet-inches)
4 x 4	6'-9"
4 x 6	8
6 x 6	14
8 x 8	14

- A. Measured to the underside of the beam.
- B. Based on 40 psf live load.
- C. The maximum permitted height is 8 feet for one-ply and two-ply beams. The maximum permitted height for three-ply beams on post cap is 6'-9".

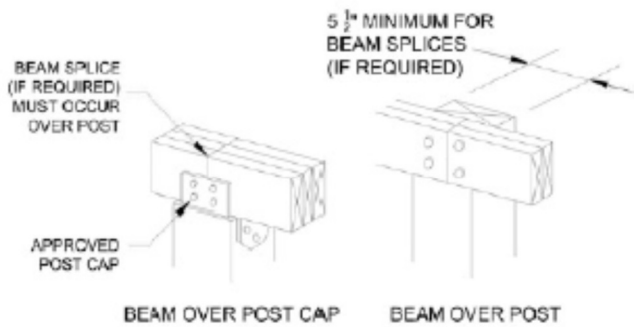


Figure R507.5.1(1)
Deck Beam To Deck Post Attachment

DETAIL B

Figure R507.5.1(2)
Notched Post-to-Beam Connection

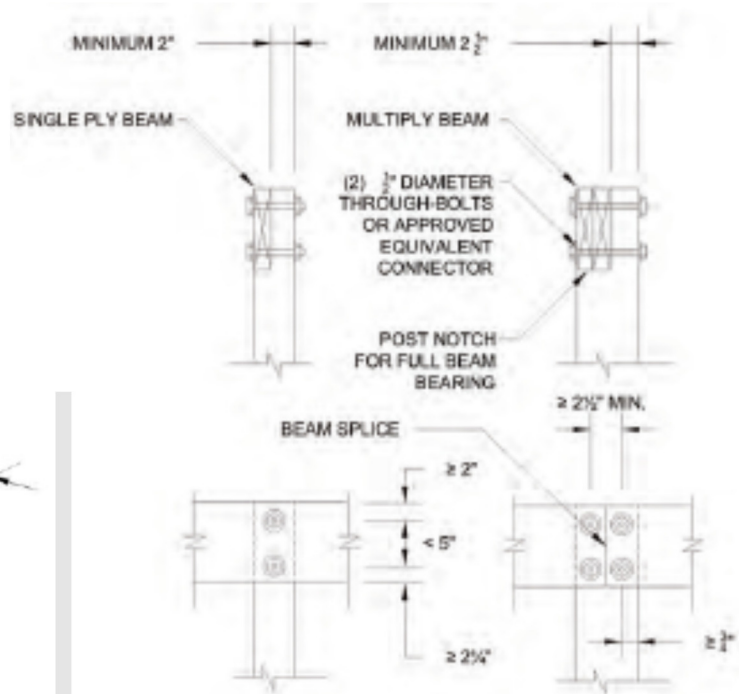
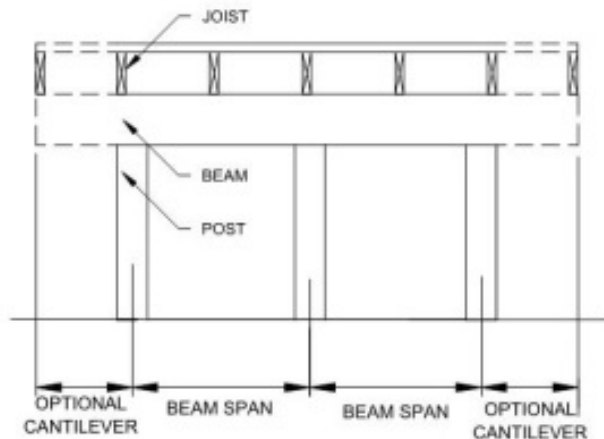
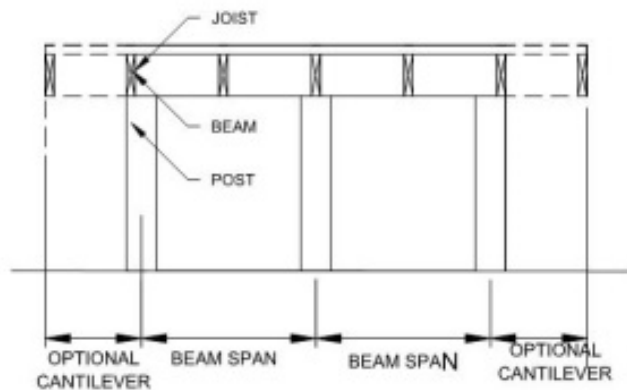


Figure R507.5
Typical Deck Joist Spans

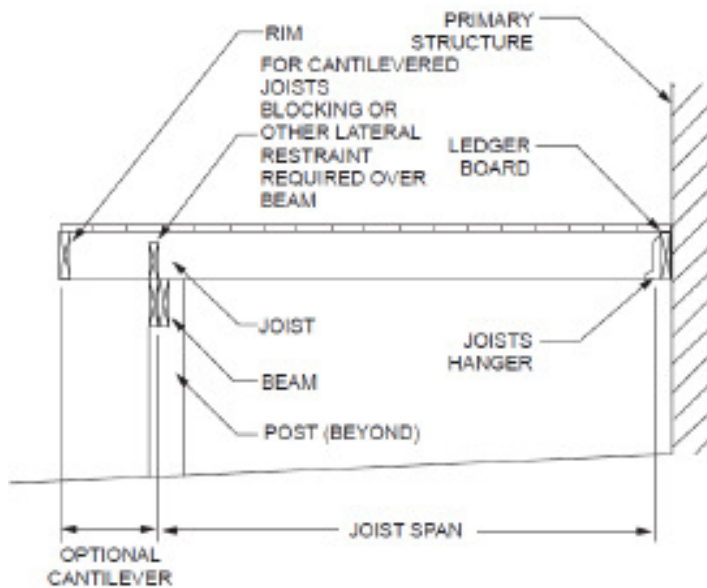


DROPPED BEAM

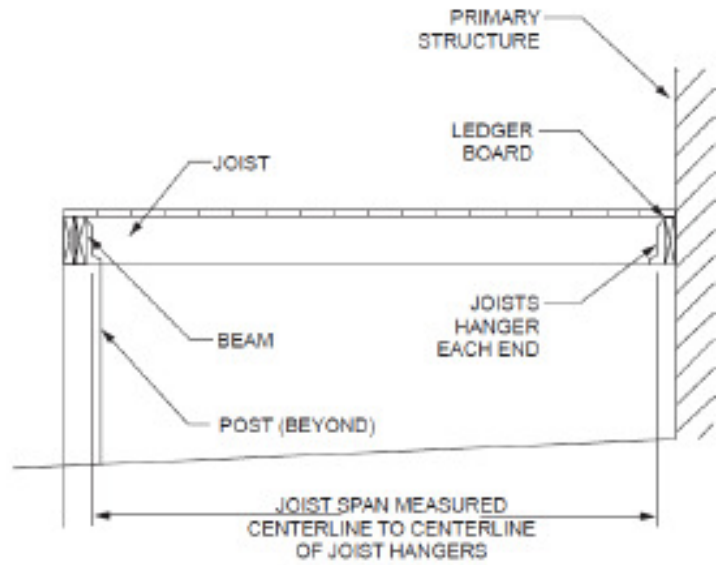


FLUSH BEAM

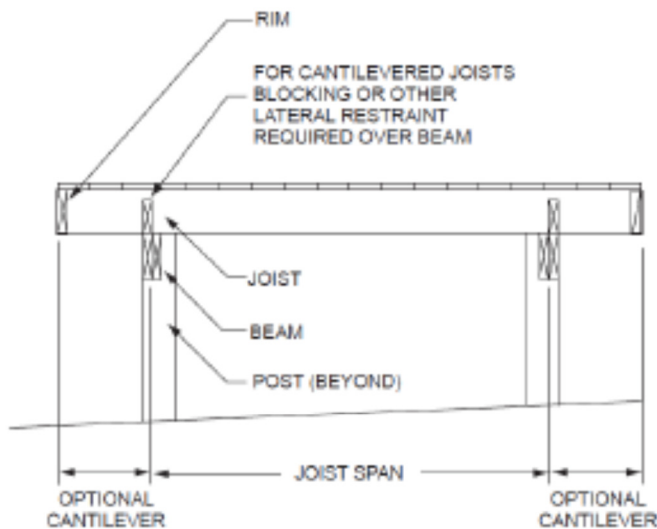
DECKS - Joists



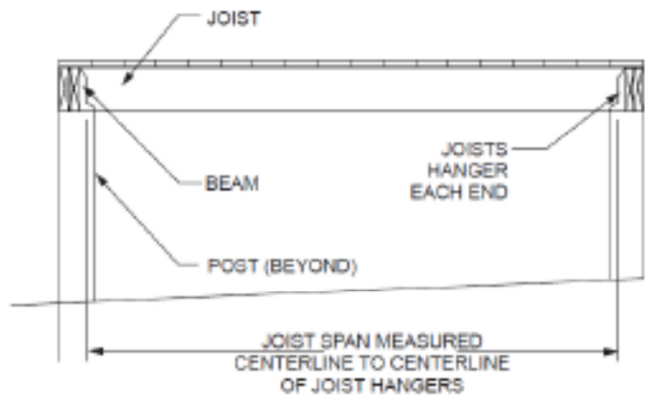
CANTILEVERED JOISTS WITH DROPPED BEAM



JOISTS WITH FLUSH BEAM



JOISTS ON FREE-STANDING DECK WITH DROPPED BEAM



JOISTS ON FREE-STANDING DECK WITH FLUSH BEAM

TABLE R507.7
MAXIMUM JOIST SPACING FOR DECKING

DECKING MATERIAL TYPE AND NOMINAL SIZE	MAXIMUM ON-CENTER JOIST SPACING	
	Decking perpendicular to joist	Decking diagonal to joist ^a
1 1/4-inch-thick wood	16 inches	12 inches
2-inch-thick wood	24 inches	16 inches
Plastic composite	In accordance with Section R507.2	In accordance with Section R507.2

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 degree = 0.01745 rad.

a. Maximum angle of 45 degrees from perpendicular for wood deck boards.

DECKS - Beam and Joist Spans

**TABLE R507.6
DECK BEAM SPAN LENGTHS^{a, b} (ft. - in.)**

SPECIES ^a	SIZE ^d	DECK JOIST SPAN LESS THAN OR EQUAL TO: (feet)						
		6	8	10	12	14	16	18
Southern pine	2 - 2 × 6	6-11	5-11	5-4	4-10	4-6	4-3	4-0
	2 - 2 × 8	8-9	7-7	6-9	6-2	5-9	5-4	5-0
	2 - 2 × 10	10-4	9-0	8-0	7-4	6-9	6-4	6-0
	2 - 2 × 12	12-2	10-7	9-5	8-7	8-0	7-6	7-0
	3 - 2 × 6	8-2	7-5	6-8	6-1	5-8	5-3	5-0
	3 - 2 × 8	10-10	9-6	8-6	7-9	7-2	6-8	6-4
	3 - 2 × 10	13-0	11-3	10-0	9-2	8-6	7-11	7-6
	3 - 2 × 12	15-3	13-3	11-10	10-9	10-0	9-4	8-10
Douglas fir-larch ^e , hem-fir ^e , spruce-pine-fir ^e , redwood, western cedars, ponderosa pine ^f , red pine ^f	3 × 6 or 2 - 2 × 6	5-5	4-8	4-2	3-10	3-6	3-1	2-9
	3 × 8 or 2 - 2 × 8	6-10	5-11	5-4	4-10	4-6	4-1	3-8
	3 × 10 or 2 - 2 × 10	8-4	7-3	6-6	5-11	5-6	5-1	4-8
	3 × 12 or 2 - 2 × 12	9-8	8-5	7-6	6-10	6-4	5-11	5-7
	4 × 6	6-5	5-6	4-11	4-6	4-2	3-11	3-8
	4 × 8	8-5	7-3	6-6	5-11	5-6	5-2	4-10
	4 × 10	9-11	8-7	7-8	7-0	6-6	6-1	5-8
	4 × 12	11-5	9-11	8-10	8-1	7-6	7-0	6-7
	3 - 2 × 6	7-4	6-8	6-0	5-6	5-1	4-9	4-6
	3 - 2 × 8	9-8	8-6	7-7	6-11	6-5	6-0	5-8
	3 - 2 × 10	12-0	10-5	9-4	8-6	7-10	7-4	6-11
	3 - 2 × 12	13-11	12-1	10-9	9-10	9-1	8-6	8-1

**TABLE R507.5
DECK JOIST SPANS FOR COMMON LUMBER SPECIES^f (ft. - in.)**

SPECIES ^a	SIZE	SPACING OF DECK JOISTS WITH NO CANTILEVER ^b (inches)			SPACING OF DECK JOISTS WITH CANTILEVERS ^c (inches)		
		12	16	24	12	16	24
Southern pine	2 × 6	9-11	9-0	7-7	6-8	6-8	6-8
	2 × 8	13-1	11-10	9-8	10-1	10-1	9-8
	2 × 10	16-2	14-0	11-5	14-6	14-0	11-5
	2 × 12	18-0	16-6	13-6	18-0	16-6	13-6
Douglas fir-larch ^d , hem-fir ^d , spruce-pine-fir ^d	2 × 6	9-6	8-8	7-2	6-3	6-3	6-3
	2 × 8	12-6	11-1	9-1	9-5	9-5	9-1
	2 × 10	15-8	13-7	11-1	13-7	13-7	11-1
	2 × 12	18-0	15-9	12-10	18-0	15-9	12-10
Redwood, western cedars, ponderosa pine ^e , red pine ^e	2 × 6	8-10	8-0	7-0	5-7	5-7	5-7
	2 × 8	11-8	10-7	8-8	8-6	8-6	8-6
	2 × 10	14-11	13-0	10-7	12-3	12-3	10-7
	2 × 12	17-5	15-1	12-4	16-5	15-1	12-4

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa, 1 pound = 0.454 kg.

a. No. 2 grade with wet service factor.

b. Ground snow load, live load = 40 psf, dead load = 10 psf, $L/\Delta = 360$.

c. Ground snow load, live load = 40 psf, dead load = 10 psf, $L/\Delta = 360$ at main span, $L/\Delta = 180$ at cantilever with a 220-pound point load applied to end.

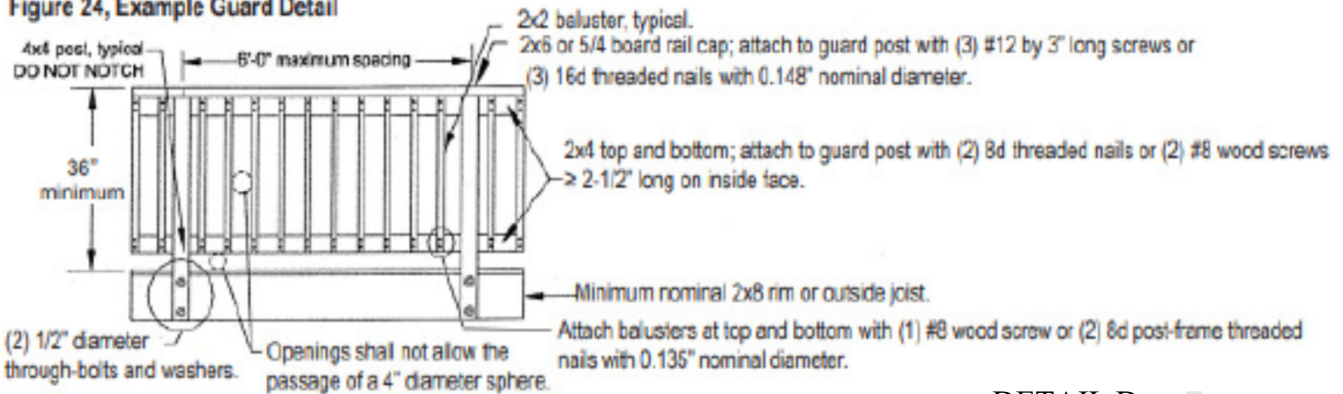
d. Includes incising factor.

e. Northern species with no incising factor

f. Cantilevered spans not exceeding the nominal depth of the joist are permitted.

DECKS - Guards & Handrails

Figure 24, Example Guard Detail



DETAIL D

Figure 30. Stair Guard Requirements.

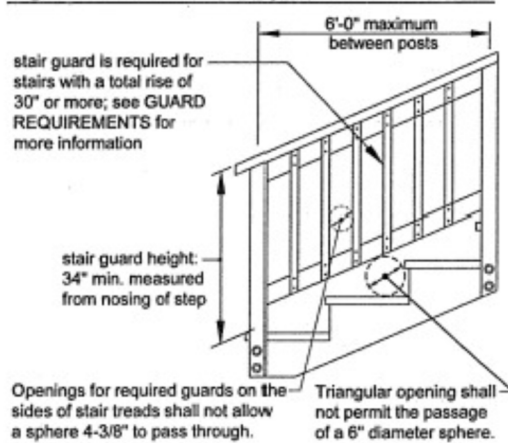


Figure 33. Miscellaneous Stair Requirements.

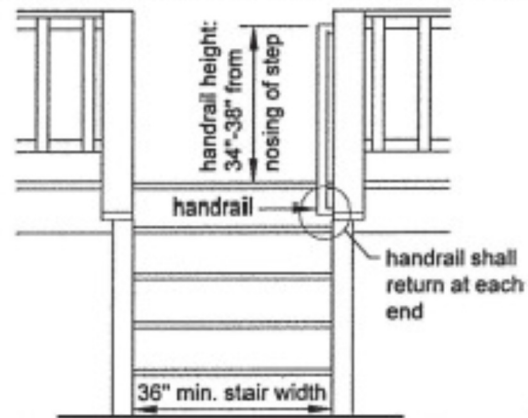


Figure 32A. Handrail Mounting Examples.

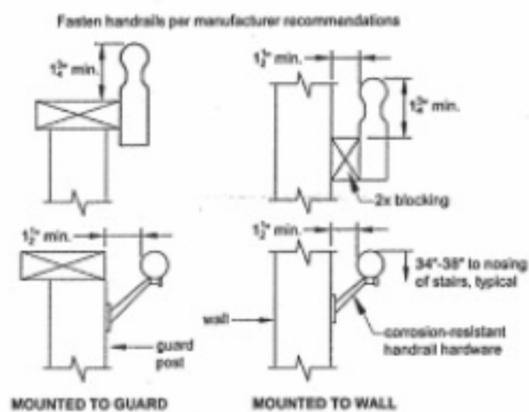


Figure 31. Stair Stringer Attachment Detail.

